

& G2 (2)). Dice similarity coefficients (DSC) were used to compare G1 and G2 spatial similarity. G1 and G2 defined structures were subsequently analysed for planned dose discrepancy.

1. Christianen ME, Langendijk JA, Westeraan HE, *et al.* Delineation of organs at risk involved in swallowing for radiotherapy treatment planning. *Radiother Oncol* 2011;101:394-402.

2. Levendag PC, Teguh DN, Voet P, *et al.* Dysphagia disorders in patients with cancer of the oropharynx are significantly affected by the radiation therapy dose to the superior and middle constrictor muscle: a dose-effect relationship. *Radiother Oncol* 2007;85:64-73.

Results: Differences in G1 and G2 delineation guidelines reported DSC values less than 0.5, indicating poor spatial correlation- SPCM (DSC=0.09±0.09, range of 0.02-0.22), MPCM (DSC=0.47±0.16, range: 0.26 to 0.63), IPCM (DSC=0.34±0.12, range: 0.19 to 0.49), CP (DSC=0.33±0.12, range: 0.12 to 0.41), and OI (DSC=0.15±0.13, range: 0 to 0.31). This difference in delineation led to dose differences for each structure (Dmean), shown in Table 1, with some structures impacted by up to 13.9 %. Such variation is indicative of the variable proximity of the pharyngeal axis to areas of steep dose heterogeneity. In general, the range of per-structure dose differences across all patients was large, showing that indicated complication probability can be highly dependent upon which guideline is chosen for clinical use.

Table 1. Dose difference of Dmean between structures delineated with G1 and G2 guidelines

	%Dose Difference SPCM	%Dose Difference MPCM	%Dose Difference IPCM	%Dose Difference CP	%Dose Difference OI
Mean±SD	-0.3±1.7	1.0±2.0	-0.7±7.6	3.8±2.1	2.1±7.3
Range	-1.7 to 2.2	-4.2 to 1.3	-13.7 to 5.9	1.2 to 5.9	-5.0 to 13.9

Conclusions: Whilst this study reported varying degrees of correlation between planned dosimetry and spatial incongruity, it highlights the potential of dosimetric variability with inconsistent delineation guidelines and the mandate to investigate with a larger patient cohort across multiple critical structures. When critical structures lie in close proximity to areas of steep dose heterogeneity, delineation disparity and subsequent dose discrepancy is of greater significance. Integrity of future DVO data demands a consensus on delineation guidelines to ensure recommendations are robust in clinical practice.

PO-0675

Post-radiation adjuvant chemotherapy with oral tegafur-uracil in high-risk nasopharyngeal carcinoma

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Purpose/Objective: To evaluate the effect of post-radiation adjuvant chemotherapy with oral tegafur-uracil in patients with high-risk nasopharyngeal carcinoma (NPC) after combined chemoradiotherapy.

Materials and Methods: Our definition of high-risk NPC included patients with 1) neck node > 6 cm; 2) supraclavicular node metastasis; 3) skull base destruction/intracranial invasion plus multiple nodes metastasis; or 4) multiple neck nodes metastasis with one of nodal size > 4 cm. One hundred and sixty-three high-risk NPC patients finished full-course of concurrent chemoradiotherapy or neoadjuvant chemotherapy plus radiotherapy. Post-radiation adjuvant chemotherapy with oral tegafur-uracil (200 mg twice daily) for 12 months was recommended to evaluate its impact on subsequent tumor relapse. One hundred and forty-one patients agreed to receive adjuvant oral tegafur-uracil. Twenty-two patients who refused adjuvant chemotherapy were served as a control.

Results: After a median follow-up of 38 months, 32 of 141 (22.7%) patients with adjuvant tegafur-uracil developed tumor relapse later, whereas 59.1% (13/22) patients without adjuvant tegafur-uracil had tumor relapse. The progression-free survival rates were significantly higher in patients with adjuvant tegafur-uracil than those without adjuvant tegafur-uracil (P<0.0001). The adjuvant chemotherapy of tegafur-uracil was well-tolerated with no grade 3/4 toxicity.

Conclusions: Post-radiation adjuvant chemotherapy with oral tegafur-uracil for 12 months significantly reduced the relapse rate in high-risk NPC patients.

POSTER: CLINICAL TRACK: LUNG

PO-0676

Verification system for image-guided radiation therapy by using in-treatment 4D CBCT

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Purpose/Objective: A four-dimensional (4D) cone-beam CT (CBCT) is widely implemented in the precise radiation therapy of lung cancer treatment. In this study, we present a novel verification system for an image-guided radiation therapy (IGRT) by using in-treatment 4D CBCT acquired during Volumetric Modulated Arc Therapy (VMAT).

Materials and Methods: A Stereotactic Body Radiation Therapy (SBRT) for lung cancer patient was performed by Elekta Synergy with a single-arc VMAT. During the beam delivery, cone-beam projection images were sequentially acquired. A respiratory signal was reproduced by an image-based phase recognition technique computed with a normalized cross correlation between adjacent projections. Then, in-treatment 4D CBCT with four phase bins was reconstructed by in-house software and the CBCT sets were exported into the treatment planning system (TPS). After a registration of the CBCT center with the isocenter position in the corresponding treatment plan, the tumor location visualized in the CBCT for each phase was compared with that in the treatment plan. To see how this system works well, in particular, the center-of-mass (COM) of gross tumor volume (GTV) for maximum inhalation and exhalation for 10 patients was compared with those estimated by the planning CT.

Results: The differences in maximum inhalation were 0.3 ± 1.3 mm, 0.2 ± 1.7 mm, -0.7 ± 3.1 mm for the LR, AP, and CC directions, respectively, whereas the differences in maximum exhalation were 0.1 ± 1.3 mm, -0.4 ± 1.8 mm, -0.1 ± 1.9 mm for the LR, AP, and CC directions, respectively.

Conclusions: In-treatment 4D CBCT is a direct method for quantitatively assessing the intrafractional location of a moving target. It was feasible to verify the tumor location during actual beam delivery with the system developed by using in-treatment 4D CBCT.

PO-0677

Three dimensional non-coplanar conformal radiotherapy with 75Gy/25fr/5w regimen for the treatment of stage I NSCLC

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Purpose/Objective: Three-dimensional non-coplanar conformal radiotherapy (3-DNCRT) has recently been considered promising for the treatment of stage I non-small cell lung cancer (NSCLC). Usually, it is performed in the form of SBRT using 10 - 20Gy fraction dose. However, this method is considered to be contraindicated for so-called central tumors because of the toxicity of serial organs, such as bronchus, large vessels, etc. We have been treating these tumors with relatively small fraction dose (usually 3Gy) keeping BED10 at the similar level to that of SBRT. In this study, we analyzed our 10-year results.

Materials and Methods: Eligibility criteria were as follows: maximum tumor diameter not greater than 5cm, PS between 0 and 2, and no limitation regarding age and pulmonary function. Radiotherapy was given with 6MV photon beam by fixed 10 non-coplanar conformal beams to a total dose of 75Gy in 25 fractions in 5 weeks. Irradiation was aiming at the ITV with proper margins. No ENI was given. Between Jan. 2002 and Dec. 2010, 111 eligible cases were treated. Age ranged from 53 to 93 (median 78). The male/female ratio was 80/31. There were 64T1 tumors and 47 T2. Twenty-four tumors were sqcca, 71 adenoca, and 16 others. There were 92 inoperable cases (83%), among them poor pulmonary function was in 66 (59%), and 19 operable cases, who refused operation. The average tumor size was 3.0 cm (range; 1.2 to 5.0 cm). There were 102 PS 1 and 9 PS 2 cases. Among the entire cases, 46 cases were central tumors and the other 65 were peripheral tumors. Median follow-up period was 46 months.

Results: Three- and 5-year local control rate (LC), overall survival rate (OS), cause-specific survival rate, and relapse-free survival rate for overall cases were, 85% and 85%, 67% and 50%, 79% and 65%, and 56% and 41%, respectively. Three-year LC and OS for T1 and T2 cases were 87%, 66%, and 87%, 69%, respectively (n.s.). Three-year LC and OS for central and peripheral tumors were 85%, 70%, and 86%, 66%, respectively (n.s.). Three- and 5-year OS for operable and inoperable